

REMARKS

Claims 1 through 24 are currently pending in the application.

This amendment is in response to the Office Action of October 8, 2003.

Information Disclosure Statement(s)

Applicants note the filing of an Information Disclosure Statement herein on July 17, 2002 and note that a copy of the PTO-1449 was not returned with the outstanding Office Action. Applicants respectfully request that the information cited on the PTO-1449 be made of record herein.

Preliminary Amendment

Applicants note the filing of two Preliminary Amendments on May 16, 2002 and August 29, 2003, which filings were not acknowledged in the outstanding Office Action. Should the Preliminary Amendments have failed to have been entered in the Office file, Applicants will provide a true copy to the Examiner.

Objection to Drawings

Applicants are supplying corrected formal drawings with this amendment to comply with the objections to drawing Fig. 4A and Fig. 5.

35 U.S.C. § 101 Claim Rejections

Claims 5, 13 and 21 are rejected under 35 U.S.C. § 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility.

In the Office Action, it is asserted that “Applicants have not asserted any specific and substantial utility for the claimed invention of ‘curing said first outermost adhesive layer results in a loss of adhesion between said first outermost adhesive layer and said second adhesive layer’ and it does not have a readily apparent well-established utility”.

Applicants respectfully disagree with such an assertion and rejection of claims 5, 13, and 21 under 35 U.S.C. § 101. Applicants clearly state in paragraph [0018] “The apparatus

comprises a tape which makes use of a multi-level adhesive that includes an outermost layer formed of a mixture of electro-magnetic radiation-curing components and adhesive. After application to a bare semiconductor die and exposure to an electro-magnetic radiation source, the mixture layer cures and bonds to the die surface, rendering a homogenous surface suitable for laser marking.” Applicants assert that such is a clear description of the utility of the claimed invention under 35 U.S.C. § 101.

Further in paragraph [0044] it is clearly stated that “Carrier tape 4 or an adhesive layer thereof may also be formed to be relatively weakly adhesive to marking tape 1, or multilevel variation thereof, allowing for easy removal of the carrier tape prior to, after, or during the laser marking of semiconductor die 20. In a preferred embodiment, the adhesive layer of the carrier tape is UV- (or electro-magnetic radiation) sensitive such that upon exposure to UV light (or electromagnetic radiation), the adhesive properties of carrier tape 4 are reduced, and carrier tape 4 may be easily peeled away or removed from marking tape 1. One such carrier tape and adhesive combination suitable for purposes of the invention comprises a UV-penetrable polyvinyl chloride tape with an acrylic UV-sensitive adhesive.” Applicants assert that such is a clear description of the utility of the claimed invention under 35 U.S.C. § 101.

Additionally, in paragraphs [0048] and [0049] it is stated that “In another preferred embodiment, carrier tape 4 can be used in conjunction with one or more levels of adhesives, at least one of the adhesives comprising laser-markable components when disposed on a surface of a bare semiconductor die 20. In one embodiment, a markable adhesive layer 2B serves to bind carrier tape 4 to a bare surface on the backside 12 of semiconductor wafer 10, and will transfer a laser-markable residue to a surface of semiconductor die 20 when carrier tape 4 is later removed. In this case, carrier tape 4 functions to provide a support and protective function during semiconductor processing, but can be peeled away to effect transfer of the laser-markable residue.

In a second related example, a carrier tape 4 with a multilayer adhesive can be used wherein a first layer of the multilayer adhesive comprises a mixture of electromagnetic radiation-curing components and an adhesive. The first mixture layer is formed of a type so as to cure and bond to a surface of a bare semiconductor die 20 upon exposure to a radiation source,

whereupon it is laser markable. A second adhesive layer can be provided over the first mixture layer, the second adhesive layer providing adherence to both the first mixture layer and carrier tape 4. The second adhesive layer may also be formed to be electromagnetic radiation-curable and adhere to the first mixture layer and carrier tape 4 in an uncured state. Upon exposure to radiation, the second adhesive layer can either cure onto the first mixture layer or, alternatively, lose its adhesive properties and facilitate peeling of carrier tape 4 from a wafer or surface of a bare semiconductor die 20.” Applicants assert that such is a clear description of the utility of the claimed invention under 35 U.S.C. § 101.

Applicants assert that the claimed inventions of claims 5, 13, and 21 having elements of the claimed invention calling for “laser-markable tape of claim 4, wherein said curing of said first outermost adhesive layer results in a loss of adhesion between said first outermost adhesive layer and said second adhesive layer” and “wherein said curing of said first outermost adhesive layer provides a loss of adhesion between said first outermost adhesive layer and said second adhesive layer” clearly have their stated utility set forth in at least paragraphs [0018], [0044], [0048], and [0049] as set forth in the specification of the application. To summarize the utility of the element of the claimed invention of claim 5, “the adhesive layer of the carrier tape is UV- (or electro-magnetic radiation) sensitive such that upon exposure to UV light (or electromagnetic radiation), the adhesive properties of carrier tape 4 are reduced, and carrier tape 4 may be easily peeled away or removed from marking tape 1” whereas the utility of the claimed inventions of claims 13 and 21 can be summarized as “[t]he second adhesive layer may also be formed to be electromagnetic radiation-curable and adhere to the first mixture layer and carrier tape 4 in an uncured state. Upon exposure to radiation, the second adhesive layer can either cure onto the first mixture layer or, alternatively, lose its adhesive properties and facilitate peeling of carrier tape 4 from a wafer or surface of a bare semiconductor die 20.”

Applicants assert that such utility of the claimed invention is clearly set forth and complies with the provisions of 35 U.S.C. § 101. Therefore, claims 5, 13, and 21 are allowable under 35 U.S.C. § 101.

35 U.S.C. § 112 Claim Rejections

Claims 5, 13, and 21 are rejected under 35 U.S.C. § 112, first paragraph, as not supported by either a specific and substantial asserted utility of a well established utility for the reasons set forth in the rejection of such claims under 35 U.S.C. § 101.

Applicants assert that claims 5, 13, and 21 clearly are supported by the specification under the provisions of 35 U.S.C. § 112, first paragraph, with the specification clearly describing the utility of such claimed inventions.

As previously stated, Applicants clearly state in paragraph [0018] “The apparatus comprises a tape which makes use of a multi-level adhesive that includes an outermost layer formed of a mixture of electro-magnetic radiation-curing components and adhesive. After application to a bare semiconductor die and exposure to an electro-magnetic radiation source, the mixture layer cures and bonds to the die surface, rendering a homogenous surface suitable for laser marking.” Applicants assert that such is a clear description of the utility of the claimed invention under 35 U.S.C. § 112, first paragraph.

Further in paragraph [0044] it is clearly stated that “Carrier tape 4 or an adhesive layer thereof may also be formed to be relatively weakly adhesive to marking tape 1, or multilevel variation thereof, allowing for easy removal of the carrier tape prior to, after, or during the laser marking of semiconductor die 20. In a preferred embodiment, the adhesive layer of the carrier tape is UV- (or electro-magnetic radiation) sensitive such that upon exposure to UV light (or electromagnetic radiation), the adhesive properties of carrier tape 4 are reduced, and carrier tape 4 may be easily peeled away or removed from marking tape 1. One such carrier tape and adhesive combination suitable for purposes of the invention comprises a UV-penetrable polyvinyl chloride tape with an acrylic UV-sensitive adhesive.” Applicants assert that such is a clear description of the utility of the claimed invention under 35 U.S.C. § 112, first paragraph.

Additionally, in paragraphs [0048] and [0049] it is stated that “In another preferred embodiment, carrier tape 4 can be used in conjunction with one or more levels of adhesives, at least one of the adhesives comprising laser-markable components when disposed on a surface of a bare semiconductor die 20. In one embodiment, a markable adhesive layer 2B serves to bind carrier tape 4 to a bare surface on the backside 12 of semiconductor wafer 10, and will transfer a

laser-markable residue to a surface of semiconductor die 20 when carrier tape 4 is later removed.

In this case, carrier tape 4 functions to provide a support and protective function during semiconductor processing, but can be peeled away to effect transfer of the laser-markable residue.

In a second related example, a carrier tape 4 with a multilayer adhesive can be used wherein a first layer of the multilayer adhesive comprises a mixture of electromagnetic radiation-curing components and an adhesive. The first mixture layer is formed of a type so as to cure and bond to a surface of a bare semiconductor die 20 upon exposure to a radiation source, whereupon it is laser markable. A second adhesive layer can be provided over the first mixture layer, the second adhesive layer providing adherence to both the first mixture layer and carrier tape 4. The second adhesive layer may also be formed to be electromagnetic radiation-curable and adhere to the first mixture layer and carrier tape 4 in an uncured state. Upon exposure to radiation, the second adhesive layer can either cure onto the first mixture layer or, alternatively, lose its adhesive properties and facilitate peeling of carrier tape 4 from a wafer or surface of a bare semiconductor die 20.” Applicants assert that such is a clear description of the utility of the claimed invention under 35 U.S.C. § 112, first paragraph.

Applicants assert that the claimed inventions of claims 5, 13, and 21 having elements of the claimed invention calling for “laser-markable tape of claim 4, wherein said curing of said first outermost adhesive layer results in a loss of adhesion between said first outermost adhesive layer and said second adhesive layer” and “wherein said curing of said first outermost adhesive layer provides a loss of adhesion between said first outermost adhesive layer and said second adhesive layer” clearly have their stated utility set forth in at least paragraphs [0018], [0044], [0048], and [0049] as set forth in the specification of the application. To summarize the utility of the element of the claimed invention of claim 5, “the adhesive layer of the carrier tape is UV- (or electro-magnetic radiation) sensitive such that upon exposure to UV light (or electromagnetic radiation), the adhesive properties of carrier tape 4 are reduced, and carrier tape 4 may be easily peeled away or removed from marking tape 1” whereas the utility of the claimed inventions of claims 13 and 21 can be summarized as “[t]he second adhesive layer may also be formed to be electromagnetic radiation-curable and adhere to the first mixture layer and carrier tape 4 in an

uncured state. Upon exposure to radiation, the second adhesive layer can either cure onto the first mixture layer or, alternatively, lose its adhesive properties and facilitate peeling of carrier tape 4 from a wafer or surface of a bare semiconductor die 20.”

Applicants assert that the utility of the claimed inventions of claims 5, 13, and 21 is clearly set forth in the specification as described therein to clearly comply with the provisions of 35 U.S.C. § 112, first paragraph. Therefore, claims 5, 13, and 21 are allowable.

Claims 5, 13 and 21 are further rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants again assert that the specification clearly enables the elements of the inventions of claims 5, 13, and 21 regarding “loss of adhesion between said first outermost adhesive layer and said second adhesive layer”.

Again as previously stated, Applicants clearly state in paragraph [0018] “The apparatus comprises a tape which makes use of a multi-level adhesive that includes an outermost layer formed of a mixture of electro-magnetic radiation-curing components and adhesive. After application to a bare semiconductor die and exposure to an electro-magnetic radiation source, the mixture layer cures and bonds to the die surface, rendering a homogenous surface suitable for laser marking.” Applicants assert that such is a clear description enabling the claimed invention under 35 U.S.C. § 112, first paragraph.

Further in paragraph [0044] it is clearly stated that “Carrier tape 4 or an adhesive layer thereof may also be formed to be relatively weakly adhesive to marking tape 1, or multilevel variation thereof, allowing for easy removal of the carrier tape prior to, after, or during the laser marking of semiconductor die 20. In a preferred embodiment, the adhesive layer of the carrier tape is UV- (or electro-magnetic radiation) sensitive such that upon exposure to UV light (or electromagnetic radiation), the adhesive properties of carrier tape 4 are reduced, and carrier tape 4 may be easily peeled away or removed from marking tape 1. One such carrier tape and adhesive combination suitable for purposes of the invention comprises a UV-penetrable

polyvinyl chloride tape with an acrylic UV-sensitive adhesive.” Applicants assert that such is a clear description enabling the claimed invention under 35 U.S.C. § 112, first paragraph.

Additionally, in paragraphs [0048] and [0049] it is stated that “In another preferred embodiment, carrier tape 4 can be used in conjunction with one or more levels of adhesives, at least one of the adhesives comprising laser-markable components when disposed on a surface of a bare semiconductor die 20. In one embodiment, a markable adhesive layer 2B serves to bind carrier tape 4 to a bare surface on the backside 12 of semiconductor wafer 10, and will transfer a laser-markable residue to a surface of semiconductor die 20 when carrier tape 4 is later removed. In this case, carrier tape 4 functions to provide a support and protective function during semiconductor processing, but can be peeled away to effect transfer of the laser-markable residue.

In a second related example, a carrier tape 4 with a multilayer adhesive can be used wherein a first layer of the multilayer adhesive comprises a mixture of electromagnetic radiation-curing components and an adhesive. The first mixture layer is formed of a type so as to cure and bond to a surface of a bare semiconductor die 20 upon exposure to a radiation source, whereupon it is laser markable. A second adhesive layer can be provided over the first mixture layer, the second adhesive layer providing adherence to both the first mixture layer and carrier tape 4. The second adhesive layer may also be formed to be electromagnetic radiation-curable and adhere to the first mixture layer and carrier tape 4 in an uncured state. Upon exposure to radiation, the second adhesive layer can either cure onto the first mixture layer or, alternatively, lose its adhesive properties and facilitate peeling of carrier tape 4 from a wafer or surface of a bare semiconductor die 20.” Applicants assert that this is clearly an enabling of the claimed invention under 35 U.S.C. § 112, first paragraph.

Applicants submit that the claimed inventions of claims 5, 13, and 21 are clearly enabled regarding “loss of adhesion between said first outermost adhesive layer and said second adhesive layer” by, at least the statements in the specification regarding elements of the inventions stating “[i]n a preferred embodiment, the adhesive layer of the carrier tape is UV- (or electro-magnetic radiation) sensitive such that upon exposure to UV light (or electromagnetic radiation), the adhesive properties of carrier tape 4 are reduced, and carrier tape 4 may be easily peeled away or

removed from marking tape 1”, [o]ne such carrier tape and adhesive combination suitable for purposes of the invention comprises a UV-penetrable polyvinyl chloride tape with an acrylic UV-sensitive adhesive”, “The first mixture layer is formed of a type so as to cure and bond to a surface of a bare semiconductor die 20 upon exposure to a radiation source, whereupon it is laser markable”, “[a] second adhesive layer can be provided over the first mixture layer, the second adhesive layer providing adherence to both the first mixture layer and carrier tape 4”, “[t]he second adhesive layer may also be formed to be electromagnetic radiation-curable and adhere to the first mixture layer and carrier tape 4 in an uncured state”, and [u]pon exposure to radiation, the second adhesive layer can either cure onto the first mixture layer or, alternatively, lose its adhesive properties and facilitate peeling of carrier tape 4 from a wafer or surface of a bare semiconductor die 20”. Applicants assert that such statements clearly enable the invention under the provisions of 35 U.S.C. § 112, first paragraph. Therefore, claims 5, 13, and 21 are allowable.

Claims 1 through 24 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants’ regard as the invention.

Applicants assert that the claimed inventions of claims 5, 13, and 21 clearly comply with the provisions of 35 U.S.C. § 112, second paragraph, because Applicants have described the claimed inventions by clearly stating that “a carrier tape 4 with a multilayer adhesive can be used wherein a first layer of the multilayer adhesive comprises a mixture of electromagnetic radiation-curing components and an adhesive”, “[t]he first mixture layer is formed of a type so as to cure and bond to a surface of a bare semiconductor die 20 upon exposure to a radiation source, whereupon it is laser markable”, “[a] second adhesive layer can be provided over the first mixture layer, the second adhesive layer providing adherence to both the first mixture layer and carrier tape 4”, “[t]he second adhesive layer may also be formed to be electromagnetic radiation-curable and adhere to the first mixture layer and carrier tape 4 in an uncured state”, “[u]pon exposure to radiation, the second adhesive layer can either cure onto the first mixture layer or, alternatively, lose its adhesive properties and facilitate peeling of carrier tape 4 from a wafer or surface of a bare semiconductor die 20”, “UV-sensitive tape can be formed, for example, of various photo-polymerizable monomers and polymers, photo-initiators, cross-linking

agents, and other photo-sensitive agents known in the art”, and “[a]dhesive layer 2 may also be chemically solvable by any number of solvents, thermally impacted, or otherwise short-lived in its adhesive properties”.

Applicants assert that such descriptions of the adhesive compounds clearly comply with the provisions of 35 U.S.C. § 112, second paragraph, regarding claims 5, 13, and 21. Applicants assert that contrary to the assertion the in Office Action that “these claims merely [are] setting forth physical characteristics . . . and [are] not setting forth [a] suitable composition which would meet such characteristics . . . since they cover any conceivable combination of ingredients either presently existing or which might be discovered in future . . . ”, that there are a defined number of known adhesives having such characteristics as set forth in claims 5, 13, and 21, not any conceivable combination of ingredients. Applicants assert that there has been no showing that there are an infinite number of conceivable combination of ingredients having any such characteristics whatsoever. Absent any showing to the contrary, Applicants assert that the claimed invention complies with the provisions of 35 U.S.C. § 112, second paragraph. Therefore, claims 5, 13, and 21 are allowable.

35 U.S.C. § 103(a) Rejections

Obviousness Rejection Based on Weng et al. (U.S. Patent 5,972,234)

Claims 1, 7 through 9, 15 through 17, 23 and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Weng et al. (U.S. Patent 5,972,234). Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants further submit that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants’ disclosure.

Applicants assert that the Weng et al. reference does not and cannot establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the presently claimed invention because the Weng et al. reference, at the very least, does not teach or suggest all the claim limitations of the presently claimed inventions of independent claims 1, 9, and 17.

Turning to the Weng et al. reference, an embodiment of a tape is laminated to the surface of an electronic substrate, i.e., a silicon wafer, by any suitable method, such as an adhesive layer may be applied between the surfaces of the electronic substrate and the tape or a polymeric based tape having an adhesive backing is used. A suitable adhesive to be utilized may be an acrylic type polymer. When an adhesive-backed polymeric tape is used, an extra release layer, or separator, may be first provided to cover the adhesive layer for protection during the laser marking process. The release layer may be formed of any suitable material such as polypropylene or PET. (See Weng et al., column 4, lines 57-67 continuing to column 5, lines 1-2.)

Applicants assert that, at the very least, the Weng et al. reference does not and cannot teach or suggest the claim limitations of independent claims 1, 9, and 17 calling for “a multilayer adhesive including . . . a first outermost adhesive layer comprising a mixture of electromagnetic radiation-curable components, said electromagnetic radiation-curable components providing a laser-markable surface upon exposure to an electromagnetic radiation source . . . and a second adhesive layer disposed between said tape and said first outermost adhesive layer”, “a multilayer adhesive including . . . a first outermost adhesive layer comprising a mixture of electromagnetic radiation-curable components for providing a mark on a laser-markable surface upon exposure thereof to electromagnetic radiation . . . and a second adhesive layer disposed between said flexible film material and said first outermost adhesive layer”, and “at least two layers of adhesive including . . . a first outermost adhesive layer comprising a mixture of electromagnetic radiation-curable components for providing a mark on a surface upon exposure thereof to electromagnetic radiation . . . and a second adhesive layer disposed between said film material and said first outermost adhesive layer”. Applicants assert that a fair reading of the Weng et al. reference teaches or suggests only the use of an (one) adhesive layer, not the claimed inventions of the use of a first adhesive layer of a mixture of electromagnetic radiation-curable components, said electromagnetic

radiation-curable components providing a laser-markable surface upon exposure to an electromagnetic radiation source . . . and a second adhesive layer disposed between said tape and said first outermost adhesive layer in conjunction with either a film material, a flexible film material, or a tape comprising a flexible film material. Weng et al. does not have any teaching or suggestion whatsoever regarding two different adhesive layers. Therefore, Weng et al. cannot and does not teach or suggest the claim limitations of the claimed inventions of independent claims 1, 9, and 17. Accordingly, such independent claims 1, 9, and 17 as well as the dependent claims 2 through 8, 10 through 16, and 18 through 24 therefrom are allowable.

Applicants additionally assert that the only possible teaching or suggestion for any first adhesive layer of a mixture of electromagnetic radiation-curable components, said electromagnetic radiation-curable components providing a laser-markable surface upon exposure to an electromagnetic radiation source . . . and a second adhesive layer disposed between said tape and said first outermost adhesive layer in conjunction with either a film material, a flexible film material, or a tape comprising a flexible film material is solely Applicants' disclosure, not the cited prior art. Further, Applicants assert that contrary to the Office Action, Weng et al. does not and cannot teach or suggest, either inherently or as an obvious optimization of the adhesive, an adhesive that is curable by electromagnetic radiation because Weng et al. only discloses an adhesive without disclosing any properties thereof. Any assertions regarding the properties of the adhesive in Weng et al. are mere speculation not based upon any disclosure of the cited prior art. Accordingly, the only teaching or suggestion for any of the claim limitations regarding the adhesive is and can only be solely Applicants' disclosure.

Any rejection based upon any portion of Applicants' disclosure cannot and does not establish a *prima facie* case of obviousness under 35 U.S.C. § 103 because it is based on Applicants' disclosure, not the cited prior art. Such a rejection is neither within the ambit of nor purview of nor contemplated by 35 U.S.C. § 103 and, clearly, improper. Therefore, claims 1 through 24 are clearly allowable.

In summary, Applicants assert that claims 1 through 24 clearly comply with the provisions of 35 U.S.C. § 101 and 35 U.S.C. § 112 as well as are allowable over the cited prior art for the reasons set forth herein.

Applicants request the allowance of claims 1 through 24 and the case passed for issue.

Respectfully submitted,

A handwritten signature in black ink, reading "James R. Duzan". The signature is written in a cursive style with a large, stylized "J" and "D".

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Document in ProLaw

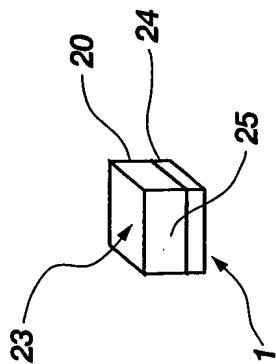


Fig. 4B

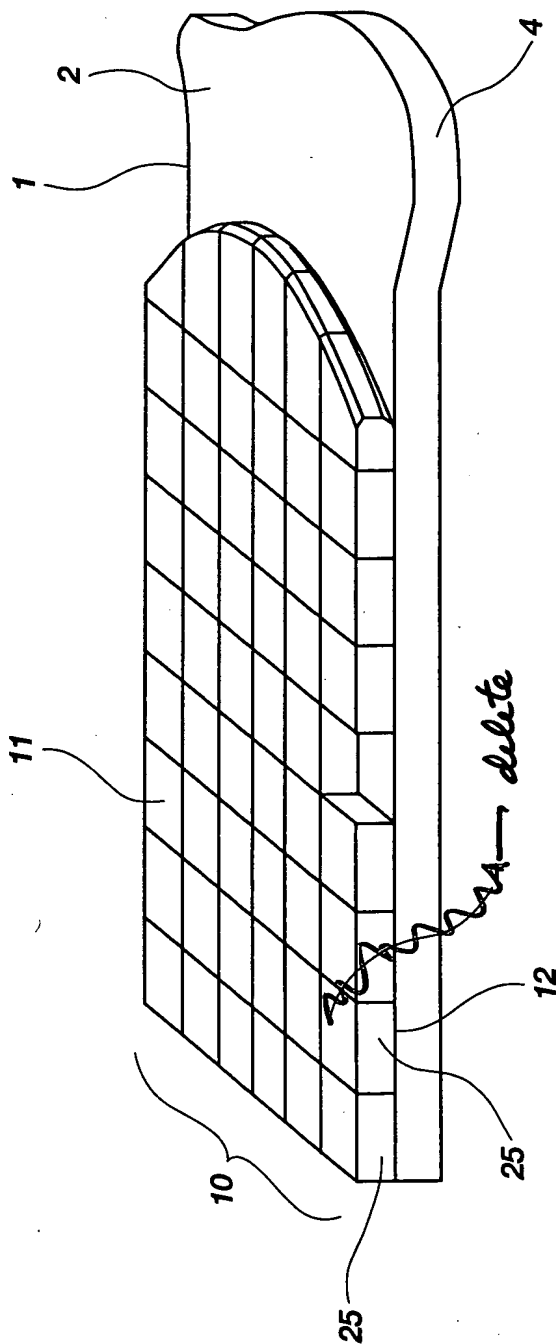


Fig. 4A

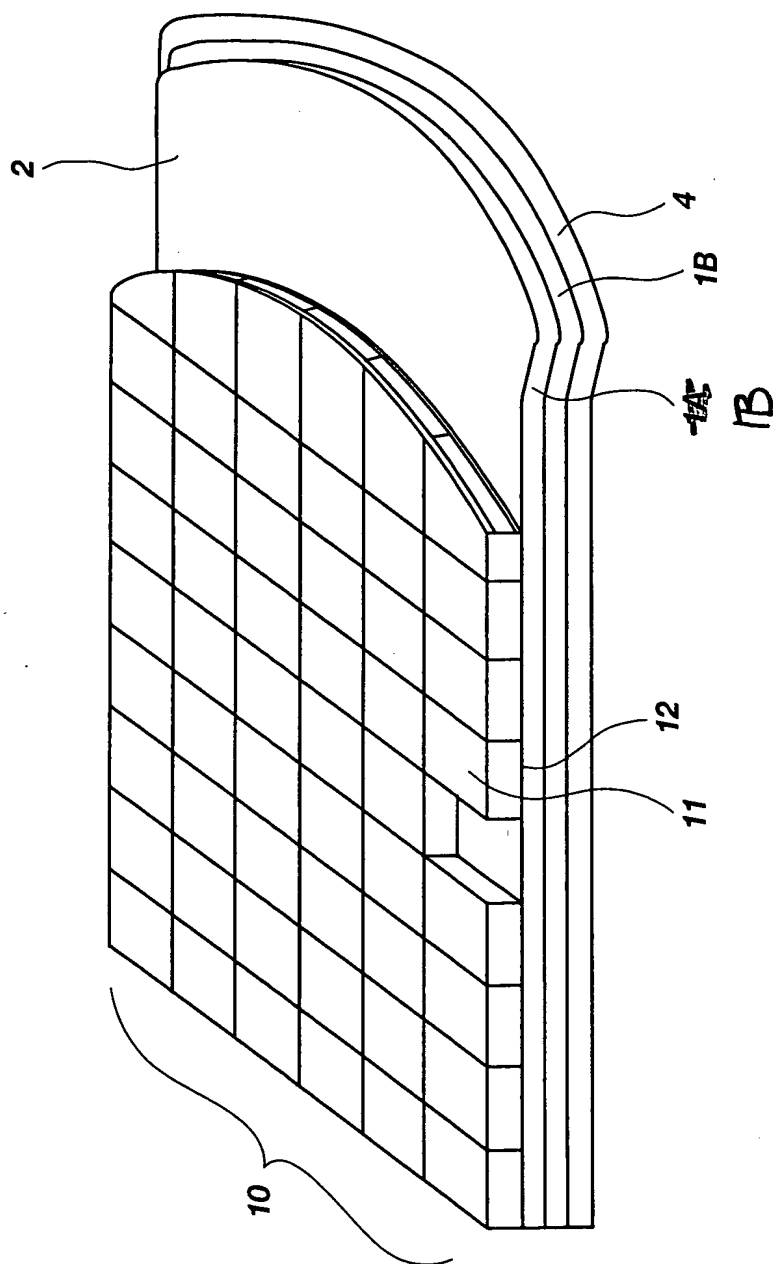


Fig. 5